Table S1. Excluded genetic and inborn metabolic syndromes

	ICD-10		ICD-9		ICD-8	
	diagnostic code and description		**diagnostic code and description**		**diagnostic code and description**	
Genetic defects	Q85.0	Neurofibromatosis (non-malignant)	237.7	Neurofibromatosis (uncertain behavior)	743.4	Neurofibromatosis
	Q85.1	Tuberous sclerosis	759.5	Tuberous sclerosis	759.6	Tuberous sclerosis
	All Q90-Q99	Chromosomal abnormalities, not elsewhere specified	758	Chromosomal anomalies	759.3	Down's syndrome
					759.4	Other syndromes due to autosomal abnormality
					759.5	Syndromes due to sex chromosome abnormality
					759.8	Other specified syndromes
					759.9	Multiple congenital anomalies, unspecified
Inborn errors of metabolism	All of E70-E72	Metabolic disorders	All of 270	Disorders of amino-acid transport and metabolism	All of 270	Congenital disorders of amino-acid metabolism

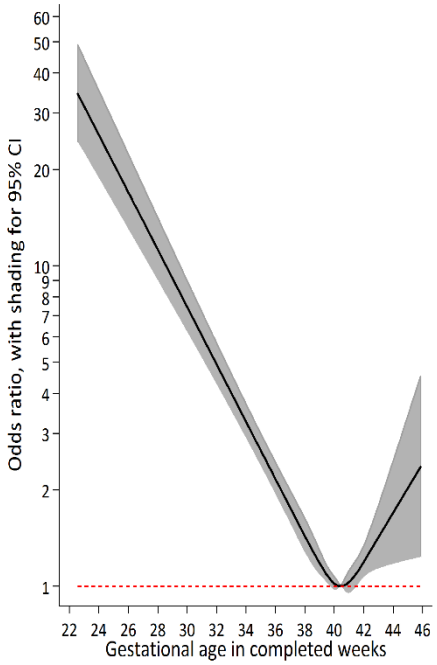
Table S2. Characteristics of individuals with complete and missing data

		Complete data [a]	Missing data	Association between characteristic and risk of missing data
Number of observations		499,881	24,896	
Percentage of the cohort		95.26	4.74	
		%	%	OR (95% CI) [b]
Female		48.8	48.1	0.97 (0.95 – 1.00)
Gestational hypertension or preeclampsia	No	96.4	92.4	
	Yes	3.6	4.1	1.19 (1.12 – 1.27)
	Missing	0.0	3.5	
Gestational diabetes	No	99.2	95.7	
	Yes	0.8	0.7	0.92 (0.79 – 1.06)
	Missing	0.0	3.5	
Maternal psychiatric history	No	67.1	68.0	
	Yes	32.9	32.1	0.96 (0.94 – 0.99)
Paternal psychiatric history	No	79.1	79.9	
	Yes	20.9	20.1	0.95 (0.92 – 0.98)
Mother's country of birth	Sweden	76.1	66.7	
	Other	23.9	33.2	1.59 (1.55 – 1.63)
	Missing	0.0	0.1	
Father's country of birth	Sweden	74.9	65.2	
	Other	25.1	34.5	1.58 (1.54 – 1.62)
	Missing	0.0	0.3	
Family disposable income quintile around birth	Lowest	14.6	27.1	2.07 (1.99 – 2.15)
	Second	20.6	17.1	0.93 (0.89 – 0.96)
	Third	21.5	16.3	0.85 (0.81 – 0.88)
	Fourth	21.7	16.5	0.85 (0.81 – 0.88)
	Highest	21.6	19.3	
	Missing	0.0	3.7	
Highest parental	≤9 years	6.6	6.6	0.94 (0.89 – 0.99)

educational attainment around birth	10 - 11 years	40.6	31.4	0.72 (0.70 – 0.74)
	≥13 years	52.8	56.8	
	Missing	0.0	5.2	
Maternal age	<20	1.8	1.9	1.18 (1.07 – 1.30)
	20-24	14.6	13.1	
	25-29	31.0	28.6	1.08 (1.02 – 1.14)
	30-34	33.7	35.4	1.22 (1.15 – 1.29)
	35-39	15.7	17.3	1.32 (1.24 – 1.40)
	40+	3.2	3.6	1.44 (1.36 – 1.53)
Paternal age	<20	0.5	0.5	1.19 (0.99 – 1.44)
	20-24	7.3	6.0	
	25-29	23.5	20.7	1.08 (1.02 – 1.14)
	30-34	33.4	33.3	1.22 (1.15 – 1.29)
	35-39	21.9	23.6	1.32 (1.24 – 1.40)
	40+	13.4	15.8	1.44 (1.36 – 1.53)
	Missing	0.0	0.2	
Intellectual disability		1.0	1.6	1.57 (1.42 – 1.74)

Notes: (a) Individuals has complete data on gestational age and covariate measures. (b) Odds ratio with 95% confidence interval. (c) Assuming the associations reported in Table 1 in the main text, higher prevalence of parental foreign-birth and advanced parental age suggests prevalence of preterm birth may have been higher among those who were excluded due to having missing data.

Fig S1. Population-level associations between risk of intellectual disability and gestational duration among those without ASD or ADHD.



Notes: The population-level association between gestational duration and risk of intellectual disability (N=476,957) was estimated using a generalized estimating equations model with a logit link, and adjusted statistically for year of birth, child sex, parity, gestational hypertension or preeclampsia, gestational diabetes, birth weight for gestational age, maternal and paternal age, maternal and paternal psychiatric history, maternal and paternal country of birth, family disposable income quintile at birth, and parental educational attainment at birth. Those born at 40 weeks and 3 gestational days are the referent.

Table S3. Population-level associations between risk of intellectual disability and gestational duration among those without ASD or ADHD.

Number of completed weeks	Odds ratio	95% CI (lower	upper)	*p*	n [a]	N [b]
21 - 31	8.25	(6.49	10.48)	<0.001	79	2,323
32 - 36	2.22	(1.90	2.60)	<0.001	185	19,073
37 - 41	1.00 [c]				1,694	418,827
42	1.07	(0.90	1.27)	0.44	139	33,227
43 - 45	1.68	(1.13	2.49)	0.011	25	3,507

Notes: (a) Number of ID cases within gestational age category; (b) Number of observations within gestational age category. (c) Those born between 37 and 41 completed weeks are the referent. (d) Population-level associations (N=476,957) were estimated using a generalized estimating equations model with a logit link, and adjusted statistically for year of birth, child sex, parity, gestational hypertension or preeclampsia, gestational diabetes, birth weight for gestational age, maternal and paternal age, maternal and paternal psychiatric history, maternal and paternal country of birth, family disposable income quintile at birth, and parental educational attainment at birth.

Table S4. Risk of intellectual disability among those born at varying gestational duration in vaginal or Caesarean deliveries

	Odds	95% CI	*p*	n [a]	N [b]

		ratio	(lower	upper)			
21 - 31 weeks	Vaginal	8.02	(6.29	10.23)	<0.001	77	1,070
	Caesarean	4.65	(3.63	5.96)	<0.001	69	1,530
32 - 36 weeks	Vaginal	1.68	(1.46	1.93)	<0.001	221	13,699
	Caesarean	2.17	(1.82	2.58)	<0.001	147	6,572
37 - 41 weeks	Vaginal	1.00 [c]				3,520	380,114
	Caesarean	1.23	(1.12	1.35)	<0.001	621	58,101
42 weeks	Vaginal	1.09	(0.96	1.22)	0.18	294	29,077
	Caesarean	1.36	(1.06	1.76)	0.017	62	5,751
43 - 45 weeks	Vaginal	1.52	(1.13	2.06)	0.006	44	2,873
	Caesarean	1.93	(1.13	3.31)	0.017	14	834

Notes: (a) Number of ID cases within gestational age category; (b) Number of observations within gestational age category. (c) Those born vaginally between 37 and 41 completed weeks are the referent. (d) Population-level associations (N=499,621) were estimated using a generalized estimating equations model with a logit link, and adjusted statistically for year of birth, child sex, parity, gestational hypertension or preeclampsia, gestational diabetes, birth weight for gestational age, maternal and paternal age, maternal and paternal psychiatric history, maternal and paternal country of birth, family disposable income quintile at birth, and parental educational attainment at birth.

Table S5. Risk of intellectual disability among those born at varying gestational duration in unassisted or assisted deliveries

		Odds ratio	95% CI (lower	upper)	*p*	n [a]	N [b]
21 - 31 weeks	Unassisted	5.81	(4.86	6.93)	<0.001	144	2,564
	Forceps or ventouse	6.89	(1.66	28.51)	0.008	2	36
32 - 36 weeks	Unassisted	1.80	(1.61	2.02)	<0.001	354	19,321
	Forceps or ventouse	1.80	(1.04	3.10)	0.036	14	950
37 - 41 weeks	Unassisted	1.00 [c]				3,814	403,120
	Forceps or ventouse	1.12	(0.99	1.25)	0.065	327	35,095
42 weeks	Unassisted	1.13	(1.00	1.26)	0.045	316	29,928
	Forceps or ventouse	0.96	(0.70	1.33)	0.82	40	4,900
43 - 45 weeks	Unassisted	1.51	(1.13	2.01)	0.006	48	3,154
	Forceps or ventouse	2.03	(1.08	3.81)	0.027	10	553

Notes: (a) Number of ID cases within gestational age category; (b) Number of observations within gestational age category. (c) Those born between 37 and 41 completed weeks in unassisted deliveries are the referent. (d) Population-level associations (N=499,621) were estimated using a generalized estimating equations model with a logit link, and adjusted statistically for year of birth, child sex, parity, gestational hypertension or preeclampsia, gestational diabetes, birth weight for gestational age, maternal and paternal age, maternal and paternal psychiatric history, maternal and paternal country of birth, family disposable income quintile at birth, and parental educational attainment at birth.

Table S6. Risk of intellectual disability among those born at varying gestational duration in spontaneous or induced deliveries

		Odds ratio	95% CI (lower	upper)	*p*	n [a]	N [b]
21 - 31 weeks	Spontaneous	5.73	(4.65	7.07)	<0.001	103	1,990
	Induced	5.07	(0.77	33.43)	0.092	1	21
32 - 36 weeks	Spontaneous	1.83	(1.59	2.11)	<0.001	225	13,108
	Induced	1.94	(1.30	2.91)	0.001	26	1,456
37 - 41 weeks	Spontaneous	1.00 [c]				2,671	303,315
	Induced	1.26	(1.10	1.45)	<0.001	259	23,845
42 weeks	Spontaneous	1.04	(0.88	1.21)	0.67	163	17,032
	Induced	1.36	(1.10	1.68)	0.005	90	8,593
43 - 45 weeks	Spontaneous	1.25	(0.76	2.06)	0.38	16	1,204
	Induced	1.74	(1.10	2.75)	0.018	19	1,241

Notes: (a) Number of ID cases within gestational age category; (b) Number of observations within gestational age category. (c) Those born between 37 and 41 completed weeks in spontaneous deliveries are the referent. (d) Population-level associations (N=371,805) were estimated using a generalized estimating equations model with a logit link, and adjusted statistically for year of birth, child sex, parity, gestational hypertension or preeclampsia, gestational diabetes, birth weight for gestational age, maternal and paternal age, maternal and paternal psychiatric history, maternal and paternal country of birth, family disposable income quintile at birth, and parental educational attainment at birth.

Table S7. Population-level and within-family associations between gestational duration and risk of intellectual disability

	Population-level association [a]						Within-family association [b]					
Number of completed weeks	Odds ratio	95% CI (lower	upper)	*p*	n [c]	N [d]	Odds ratio	95% CI (lower	upper)	*p*	n [c]	N [d]
21 - 31	5.72	(4.80	6.82)	<0.001	146	2,601	7.84	(4.55	13.50)	<0.001	85	112
32 - 36	1.78	(1.60	2.00)	<0.001	368	20,271	1.79	(1.42	2.24)	<0.001	213	430
37 - 41	1.00 [e]				4,141	438,215	1.00 [e]				2,706	6,836
42	1.08	(0.97	1.21)	0.15	356	34,828	1.21	(0.99	1.48)	0.056	252	579
43 - 45	1.54	(1.19	2.01)	0.001	58	3,706	2.07	(1.28	3.36)	0.003	40	77

Notes: (a) Population-level associations (N=499,621) were estimated using a generalized estimating equations model with a logit link, and adjusted statistically for year of birth, child sex, parity, gestational hypertension or preeclampsia, gestational diabetes, birth weight for gestational age, maternal and paternal age, maternal and paternal psychiatric history, maternal and paternal country of birth, family disposable income quintile at birth, and parental educational attainment at birth. (b) Within-family associations (N=8,034) were estimated using a conditional likelihood logistic regression model, and adjusted statistically for year of birth, child sex, parity, gestational hypertension or preeclampsia, gestational diabetes, birth weight for gestational age, maternal and paternal age, family disposable income quintile at birth, and parental educational attainment at birth. (c) Number of ID cases within gestational age category; (d) Number of observations within gestational age category; (e) Those born between 37 and 41 completed weeks are the referent.

Table S8. Exclusions due to improbable combination of weight and gestational age

Gestational age in completed weeks	N	Improbable combinations of birth weight and gestational age [a]	
		n	% within gestational age category
22	1	0	0.00
23	20	1	5.00
24	66	2	3.03
25	126	5	3.97
26	192	2	1.04
27	262	6	2.29
28	285	3	1.05
29	403	1	0.25
30	532	7	1.32
31	750	9	1.20
32	1,042	9	0.86
33	1,712	7	0.41
34	2,744	7	0.26
35	4,957	8	0.16
36	9,862	15	0.15
37	23,523	28	0.12
38	68,386	35	0.05
39	113,559	37	0.03
40	140,409	32	0.02
41	92,488	18	0.02
42	34,837	9	0.03
43	3,438	2	0.06
44	221	0	0.00
45	49	0	0.00
Total	499,864	243	0.05

Notes: (a) Improbable combinations of birth weight and gestational age were defined as values more than 3 interquartile ranges below the 25th percentile, or more than 3 interquartile ranges above the 75th percentile, of sex- and week-specific birth weight distributions.